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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/626,055
Filing Date: July 23, 2003
Appellant(s): HOANG ET AL.

Eric S. Replogle
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 7 September appealing from the Office action mailed 6 April 2010.

(1) Real Party in Interest

The examiner has no comment on the statement, or lack of statement, identifying by name the real party in interest in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The following is a list of claims that are rejected and pending in the application:

1-3, 5-11, 13-16, 18-21, 23-27, 30-46, 49-53, 56-60, 62-67, 69-72, 74 and 75.

(4) Status of Amendments After Final

The examiner has no comment on the appellant's statement of the status of amendments after final rejection contained in the brief.

(5) Summary of Claimed Subject Matter

The examiner has no comment on the summary of claimed subject matter contained in the brief.

(6) Grounds of Rejection to be Reviewed on Appeal

The examiner has no comment on the appellant's statement of the grounds of rejection to be reviewed on appeal. Every ground of rejection set forth in the Office action from which the appeal is taken (as modified by any advisory actions) is being maintained by the examiner except for the grounds of rejection (if any) listed under the subheading "WITHDRAWN

REJECTIONS." New grounds of rejection (if any) are provided under the subheading "NEW GROUNDS OF REJECTION."

(7) Claims Appendix

The examiner has no comment on the copy of the appealed claims contained in the Appendix to the appellant's brief.

(8) Evidence Relied Upon

N. Golmie et al., "A Differentiated Optical Services Model for WDM Networks", IEEE Communications Magazine, February 2000

A. Jukan et al., "Constraint-based Path Selection Methods for On-demand Provisioning in WDM Networks", IEEE INFOCOM 2002, 23-27 June 2002

6,791,948	Desnoyers et al.	9-2004
2002/0120766	Okajima et al.	8-2002
2003/0198227	Matsuura et al.	10-2003
7,013,084	Battou et al.	3-2006
2003/0074443	Melaku et al.	4-2003

Lang et al., "Link Management Protocol", draft-ietf-mpls-lmp-02.txt, 2001

"Graph Theory with Applications to Engineering and Computer Science" by N. Deo, Prentice-Hall, 1974, pp. 137-144

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

1. Claims 1-3, 5-8, 14-15, 18-20, 23-27, 31-32, 34-38, 40-46, 49-53, 56 and 71-72 are rejected under 35 U.S.C. 103(a) as being unpatentable over Golmie et al. (N. Golmie et al., "A

Differentiated Optical Services Model for WDM Networks", IEEE Communications Magazine, February 2000) in view of Jukan et al. (A. Jukan et al., "Constraint-based Path Selection Methods for On-demand Provisioning in WDM Networks", IEEE INFOCOM 2002, 23-27 June 2002) and Desnoyers et al. (U.S. Patent 6,791,948 B1).

Regarding claims 1, 14, 18 and 31, Golmie et al. teaches in FIG. 3 and Table 1 to divide a WDM network into separate service levels. The difference between Golmie et al. and the claimed invention is that Golmie et al. does not teach how to determine service level topology. Jukan et al. teaches on page 827 left col. continuity constraints. Jukan et al. teaches on page 831 right col. distributed discovery of wavelength paths by each access node. One of ordinary skill in the art would have been motivated to combine the teaching of Jukan et al. with the WDM network of Golmie et al. because the method of Jukan et al. allow automatic discovery of network topology in a mesh network. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the decentralized network topology discovery method, as taught by Jukan et al., in the WDM network of Golmie et al.

The combination of Golmie et al. and Jukan et al. still fails to teach to use available wavelength for determining network topology. However, it is obvious to one of ordinary skill in the art that the method of Jukan et al. can be used to discovered network topology. For example, Desnoyers et al. teaches in col. 2, lines 56-65 to use request message to discover network topology. For network topology discovery, one of ordinary skill in the art would have used all available wavelengths instead of the idle wavelengths. One of ordinary skill in the art would have been motivated to combine the teaching of Desnoyers et al. with the modified WDM network of Golmie et al. and Jukan et al. because using request message requires less processing

power and information storage capacity as compared with conventional method such as OSPF. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the probing method of Jukan et al. for topology discovery as suggested by Desnoyers et al. because using request message requires less processing power and information storage capacity as compared with conventional method such as OSPF.

Regarding claim 2, 19 and 32, Golmie et al. teaches in Table 1 BER.

Regarding claim 3, the modified method of Golmie et al., Jukan et al. and Desnoyers et al. determines service level network topology.

Regarding claims 5-6 and 15, Jukan et al. teaches on page 827, left col. wavelength continuity constraints.

Regarding claim 7, Desnoyers et al. teaches in col. 19, lines that the same method can be used for determine changes for maintaining network topology.

Regarding claim 8, Golmie et al. teaches in Table 1 BER and other service level parameters.

Regarding claim 20 and 23, Jukan et al. teaches on page 828, left col. service-specific wavelength set.

Regarding claim 24, Desnoyers et al. teaches in FIG. 2 network topology database 33.

Regarding claim 25, Golmie et al. teaches in Table 1 BER and other service level parameters.

Regarding claims 26-27, the modified method of Golmie et al., Jukan et al. and Desnoyers et al. determines service level network topology.

Regarding claim 34, Jukan et al. teaches comparing service-specific wavelength sets.

Regarding claims 35-36, the modified method of Golmie et al., Jukan et al. and Desnoyers et al. determines service level network topology by sending message to find reachable paths.

Regarding claim 37, Desnoyers et al. teaches in FIG. 2 processor and system memory. It is well known to one of ordinary skill in the art that instructions for controlling the processor can be stored in memory.

Regarding claim 38, Golmie et al. teaches in Table 1 BER and other service level parameters.

Regarding claim 40, Jukan et al. teaches comparing service-specific wavelength sets.

Regarding claims 41-42, the modified method of Golmie et al., Jukan et al. and Desnoyers et al. determines service level network topology by sending message to find reachable paths.

Regarding claims 43-46, Jukan et al. teaches real-time path setup.

Regarding claim 49, Jukan et al. teaches on page 827, left col. wavelength continuity constraints.

Regarding claim 50, Desnoyers et al. teaches in FIG. 2 processor and system memory. It is well known to one of ordinary skill in the art that instructions for controlling the processor can be stored in memory.

Regarding claims 51-53, Jukan et al. teaches real-time path setup.

Regarding claim 56, Jukan et al. teaches on page 827, left col. wavelength continuity constraints.

Regarding claims 71-72, Desnoyers et al. teaches in FIG. 2 network topology database 33.

2. Claims 9, 33, 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Golmie et al., Jukan et al. and Desnoyers et al. as applied to claims 1-3, 5-8, 14-15, 18-20, 23-27, 31-32, 34-38, 40-46, 49-53, 56 and 71-72 above, and further in view of Lang et al. (Lang et al., "Link Management Protocol", draft-ietf-mpls-lmp-02.txt, 2001).

Golmie et al., Jukan et al. and Desnoyers et al. have been discussed above in regard to claims 1-3, 5-8, 14-15, 18-20, 23-27, 31-32, 34-38, 40-46, 49-53, 56 and 71-72. The difference between Golmie et al., Jukan et al. and Desnoyers et al. and the claimed invention is that Golmie et al., Jukan et al. and Desnoyers et al. do not teach link management protocol. Link management protocol is well known in the art for tracking link status of links between adjacent nodes. Lang et al. teaches the details of a link management protocol (LMP). One of ordinary skill in the art would have been motivated to combine the teaching of Lang et al. with the modified WDM network of Golmie et al., Jukan et al. and Desnoyers et al. because LMP provides verification, link property correlation and fault management functions for managing links. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use LMP for managing links, as taught by Lang et al., in the modified WDM network of Golmie et al., Jukan et al. and Desnoyers et al. because LMP provides verification, link property correlation and fault management functions for managing links.

3. Claims 10-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Golmie et al., Jukan et al. and Desnoyers et al. as applied to claims 1-3, 5-8, 14-15, 18-20, 23-27, 31-32,

34-38, 40-46, 49-53, 56 and 71-72 above, and further in view of Okajima et al. (U.S. Patent Application Pub. 2002/0120766 A1).

Golmie et al., Jukan et al. and Desnoyers et al. have been discussed above in regard to claims 1-3, 5-8, 14-15, 18-20, 23-27, 31-32, 34-38, 40-46, 49-53, 56 and 71-72. The difference between Golmie et al., Jukan et al. and Desnoyers et al. and the claimed invention is that Golmie et al., Jukan et al. and Desnoyers et al. do not teach comparing parameters of links with service level parameters. Okajima et al. further teaches in FIG. 5 to monitor variable link metrics to determine whether link metrics have been changed and update link metrics accordingly. One of ordinary skill in the art would have been motivated to combine the teaching of Okajima et al. with the modified WDM network of Golmie et al., Jukan et al. and Desnoyers et al. because a link must meet service level criteria for providing the associated QoS. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to compare link parameters with classification criteria, as taught by Okajima et al., in the modified WDM network of Golmie et al., Jukan et al. and Desnoyers et al. because a link must meet service level criteria for providing the associated QoS.

4. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Golmie et al., Jukan et al. and Desnoyers et al. as applied to claims 1-3, 5-8, 14-15, 18-20, 23-27, 31-32, 34-38, 40-46, 49-53, 56 and 71-72 above, and further in view of Matsuura et al. (U.S. Patent Application Pub. 2003/0198227 A1).

Golmie et al., Jukan et al. and Desnoyers et al. have been discussed above in regard to claims 1-3, 5-8, 14-15, 18-20, 23-27, 31-32, 34-38, 40-46, 49-53, 56 and 71-72. The difference between Golmie et al., Jukan et al. and Desnoyers et al. and the claimed invention is that Golmie

et al., Jukan et al. and Desnoyers et al. do not teach to use number of wavelength conversion as criteria. Matsuura et al. teaches in paragraphs [0014] and [0017] that wavelength conversion devices are expensive and the number of wavelength conversion is kept to a minimum in setting up a lightpath. One of ordinary skill in the art would have been motivated to combine the teaching of Matsuura et al. with the modified WDM network of Golmie et al., Jukan et al. and Desnoyers et al. to limit the number of wavelength conversion used because wavelength conversion devices are expensive and a OXC can have only limited number of wavelength conversion devices to be shared for all lightpaths. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use number of wavelength conversions as a criteria for service level, as taught by Matsuura et al., in the modified WDM network of Golmie et al., Jukan et al. and Desnoyers et al. to limit the number of wavelength conversions used because wavelength conversion devices are expensive and a OXC can have only limited number of wavelength conversion devices to be shared for all lightpaths.

5. Claims 16 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Golmie et al., Jukan et al. and Desnoyers et al. as applied to claims 1-3, 5-8, 14-15, 18-20, 23-27, 31-32, 34-38, 40-46, 49-53, 56 and 71-72 above, and further in view of Battou et al. (U.S. Patent 7,013,084 B2).

Golmie et al., Jukan et al. and Desnoyers et al. have been discussed above in regard to claims 1-3, 5-8, 14-15, 18-20, 23-27, 31-32, 34-38, 40-46, 49-53, 56 and 71-72. The difference between Golmie et al., Jukan et al. and Desnoyers et al. and the claimed invention is that Golmie et al., Jukan et al. and Desnoyers et al. do not teach a centralized network management server. Battou et al. teaches in FIG. 30 network management system (NMS) for managing a network.

Battou et al. teaches in FIG. 34 topology manager of NMS for providing a topological view of the network. One of ordinary skill in the art would have been motivated to combine the teaching of Battou et al. with the modified WDM network of Golmie et al., Jukan et al. and Desnoyers et al. because a NMS provides a topological view of the network to craftsperson for operation and maintenance. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to include a NMS, as taught by Battou et al., in the modified WDM network of Golmie et al., Jukan et al. and Desnoyers et al. because a NMS provides a topological view of the network to craftsperson for operation and maintenance.

6. Claims 30 and 57-60, 62-67, 69-70 are rejected under 35 U.S.C. 103(a) as being unpatentable over Golmie et al., Jukan et al. and Desnoyers et al. as applied to claims 1-3, 5-8, 14-15, 18-20, 23-27, 31-32, 34-38, 40-46, 49-53, 56 and 71-72 above, and further in view of Melaku et al. (U.S. Patent Application Pub. 2003/0074443 A1).

Golmie et al., Jukan et al. and Desnoyers et al. have been discussed above in regard to claims 1-3, 5-8, 14-15, 18-20, 23-27, 31-32, 34-38, 40-46, 49-53, 56 and 71-72. The difference between Golmie et al., Jukan et al. and Desnoyers et al. and the claimed invention is that Golmie et al., Jukan et al. and Desnoyers et al. do not teach to change service level. Melaku et al. teaches in FIG. 5 QoS broker for handling service level change request. Melaku et al. teaches in paragraph. [0056] that if a user decides to change QoS requirements in the midst of a session, new resources are to be reallocated and a new path that meets the requested QoS is established. One of ordinary skill in the art would have been motivated to combine the teaching of Melaku et al. with the modified WDM network of Golmie et al., Jukan et al. and Desnoyers et al. because a QoS broker allows users to change service level depending on changes of their application needs.

Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to include a QoS broker for handling service level change requests, as taught by Melaku et al., in the modified WDM network of Golmie et al., Jukan et al. and Desnoyers et al. because a QoS broker allows users to change service level depending on changes of their application needs.

7. Claims 74-75 are rejected under 35 U.S.C. 103(a) as being unpatentable over Golmie et al., Jukan et al. and Desnoyers et al. as applied to claims 1-3, 5-8, 14-15, 18-20, 23-27, 31-32, 34-38, 40-46, 49-53, 56 and 71-72 above, and further in view of Deo ("Graph Theory with Applications to Engineering and Computer Science" by N. Deo, Prentice-Hall, 1974, pp. 137-144).

Golmie et al., Jukan et al. and Desnoyers et al. have been discussed above in regard to claims 1-3, 5-8, 14-15, 18-20, 23-27, 31-32, 34-38, 40-46, 49-53, 56 and 71-72. The difference between Golmie et al., Jukan et al. and Desnoyers et al. and the claimed invention is that Golmie et al., Jukan et al. and Desnoyers et al. do not teach to use a table or a tree to represent service level topology. Networks are mathematically represented as graphs. Deo teaches in chapter 7 to represent graphs as matrix (or table). One of ordinary skill in the art would have been motivated to combine the teaching of Deo with the modified machine-readable medium of Golmie et al., Jukan et al. and Desnoyers et al. to represent network as matrix because matrices are better for computer processing. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to represent service level topology structures as table, as taught by Deo, in the modified machine-readable medium of Golmie et al., Jukan et al. and Desnoyers et al.

(10) Response to Argument

The Appellant argues on pages 16-17 "Thus, the combination of Golmie, Jukan, and Desnoyers is a QoS service model in the optical domain based on a set of optical parameters that captures the quality and reliability of an optical lightpath (not paths and wavelengths individually), using a messaging system to discover paths between one source-destination pair, and having remote computers discover the electrically switched network topology." The Examiner disagrees with the Appellant's characterization of the combination of the references. The Examiner cites several references in the rejections. The Examiner recognizes that there are many ways to modify the references and some of the modifications must differ from the claimed invention. Therefore, non-obvious cannot be established by showing a modification that differs from the claimed invention.

The Appellant argues on pages 17-18 "Jukan discloses discovering paths between a single source destination pair for one requested service. Thus, because Jukan discloses discovering paths for only one service and one service destination pair but not determining service level topologies for multiple service levels, where each service level topology includes end-to-end paths from one source to all reachable destinations, Jukan does not disclose 'determining service level topologies ... said each service level topology comprises end to end paths satisfying the corresponding service level from that access node to all other reachable access nodes in said optical network as destinations.' Therefore, Appellant respectfully submits that the combination of Golmie and Jukan does not teach or suggest this claim element."
In response to Appellant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on

combinations of references. See In re Keller, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); In re Merck & Co., 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

The Appellant argues on pages 18 of the Brief: "Furthermore, none of Golmie, Jukan, or Desnoyers discloses any particular structure of a network topology database. In the Office Action, the Examiner asserts that the combination discloses storing end-to-end paths. However, Appellant respectfully submits that disclosing storing end-to-end paths does imply any particular network database structures. Furthermore, the Examiner does not cite any section Golmie, Jukan, or Desnoyers that discuss the particular structure of the network topology database. Thus, Appellant respectfully submits that the Examiner has not demonstrated how any of Golmie, Jukan, or Desnoyers teaches or suggests Appellants' particular claimed structure for service level topologies stored in a service level connectivity database." The Examiner disagrees. Desnoyers et al. clearly teaches in FIG. 2 network topology database 33 and in col. 7, lines 1-37 that the topology database stores end-to-end path information. Jukan et al. teaches on page 829, left col., definition 3 service-differentiated path information. Golmie et al. teaches on page 72, left col. optical resource allocator which keeps track of the resources, such as the number of wavelengths, links, crossconnects, and amplifiers, available for each lightpath and evaluates the lightpath characteristics and functional capabilities. This implies that there must be a database containing all these information.

The Appellant cites on page 19 of the Brief prior art OSPF which is not used in the rejection and argues that the claimed invention is non-obvious over OSPF. Since the prior art is not used in the rejection, the Appellant's argument is moot.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/S. K. L./

Primary Examiner, Art Unit 2613

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